

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte TSUNEO SASAKI, “Deceased,”
and FUMIO OHTOMO

Appeal No. 98-1287
Application 08/359,706¹

ON BRIEF

Before KRASS, JERRY SMITH, and BLANKENSHIP, Administrative Patent Judges.

BLANKENSHIP, Administrative Patent Judge.

¹ Application for patent filed December 20, 1994.

DECISION ON APPEAL

This is a decision on the appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 1-10, which constitute all the claims remaining in the application.

We reverse.

BACKGROUND

Appellants' invention relates to survey instruments. Appellants disclose a mechanism for aligning the optical axis of a telescope in a survey instrument with the center of a target. In the disclosed embodiment, appellants provide light from an emitter that is transmitted to a target prism, and reflected back from the target to an image sensor.

Claims 1-10 are present, with Claims 1 and 2 being independent. Appellants' Claim 1 is illustrative.

1. A survey instrument, comprising a solid state image sensor, a telescope for receiving light from a target, said telescope having an optical axis along which said light travels toward said sensor, an emitter for emitting flash light toward said target, said emitter being in an on condition during each said flash and in an off condition between said flashes, and a survey controller for calculating the difference of image signals from the solid state image sensor between while said emitter is in on condition and while in off condition, whereby the center position of the image of the target on the solid state image sensor is detected, based on the position of the image of the emitter.

The examiner relies on the following references:

Wells et al. (Wells)	4,717,251	Jan. 5, 1988
Shoemaker	4,968,147	Nov. 6, 1990
Wiklund	5,051,934	Sep. 24, 1991

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McClenahan et al. (McClenahan) 5,489,983

Feb. 6, 1996

A rejection under 35 U.S.C. § 112, second paragraph was present in the Final Rejection mailed October 17, 1996 (Paper 7). The examiner has withdrawn the rejection due to entry of the amendment after Final Rejection, submitted April 16, 1997 (Paper 10). (See Answer at 4.)

The following rejection is thus on appeal before us: Claims 1-10 are rejected for obviousness under 35 U.S.C. § 103 over Wiklund, Wells, McClenahan, and Shoemaker.

OPINION

Grouping of Claims

Appellants assert that there are two groups of Claims: Group I (Claims 1 and 3-7); and Group II (Claims 2 and 8-10). (Brief at 6.) The examiner determines that due to dependencies, and multiple dependencies, Group I should include Claims 1, 3/1, and 7/1, and that Group II should include Claims 2, 3/2, 4, 5, 6, 7/2, 8, 9, and 10. (Answer at 3.)

Appellants submit separate arguments for Claim 1 (pages 6 through 11 of the Brief) and Claim 2 (pages 11 through 14). However, the claim dependencies are as noted by the examiner. Thus, Claims 3/1 and 7/1 stand or fall with Claim 1, and Claims 3/2, 4, 5, 6, 7/2, 8, 9, and 10 stand or fall with Claim 2. See 37 CFR § 1.192(c)(7).

Discussion

Claims 1, 3/1, and 7/1

The examiner contends that Wiklund discloses everything claimed except for four elements: a telescope; a solid state image sensor; “the on-off arrangement;” and “the target center”. (Answer at 4.)

In the examiner’s opinion, Wells discloses the use of a telescope and a solid state image sensor; McClenahan discloses using an on-off arrangement; and Shoemaker discloses the reasoning behind having a target center. (Answer at 4.)

Our review of the Wiklund reference reveals that Wiklund was faced with a problem similar to that facing appellants; namely, a need for accurate alignment of a survey instrument with a target. Wiklund ensures proper alignment by “rotational modulation” of a measuring light beam. As shown in Fig. 2, oscillator 13 is used for modulating a light signal sent via transmitter 11. The light signal is reflected by target prism 12 back to receiver 14. The reflected light signal is detected by rotational modulation detector 24. The detected light signal is used as a feedback signal for positioning of the instrument by means of motors 26 and 27. See column 5, line 42 through column 6, line 34 of the reference. The two additional embodiments (shown in Figs. 4 and 5) also ensure proper alignment by a “rotational modulation” of transmitted light beams.

The Wiklund reference refers, in column 6, lines 18-20, to U.S. Patent No. 4,712,915 for details of the "rotational modulation" system. We are attaching a copy of the '915 patent (Kosakowski et al.) to this decision. As shown in Fig. 2 of the '915 patent, light from laser transmitter 1 is modulated in two ways: by a high frequency modulator 15; and by a low frequency "rotational modulation," created by means of motor 9 rotating aperture system 8. Details of the aperture system are shown in Fig. 3. The central portion of the beam from the laser (11) remains unblocked, while the periphery of the beam is swept at the low frequency, resulting in a light distribution as shown in Figs. 1a and 1b of the patent. As shown in Fig. 2 of the '915 patent, the beam is transmitted to target prism 2, and returns coaxially to receiver 3. Distance detector 14 uses the high frequency portion of the returned signal (a_1) to determine distance from difference in phase. The low frequency portion of the signal (a_2) is processed by circuitry for adjusting alignment of the instrument, by means of a servomechanism including servomotors 24 and 27.

The '915 patent does not provide details of receiver 3. However, the survey instrument is not aligned by sensing and centering the image of target 2 on receiver 3, but by detection of a low frequency modulated signal. It is not apparent that flashing transmitter 1 for calculating differences in image signals would be an improvement of, or even compatible with, the disclosed servomechanism. If the disclosed alignment system of Wiklund is to be modified based on the teachings of McClenahan, the examiner has not explained what the artisan would have been motivated to do.

The examiner refers to Shoemaker as showing that “it is well known in the measuring art to obtain the center of the target thereby resulting in accurate alignment between the light source and the target.” (Answer, page 5.) Shoemaker discloses a laser target system for use in the alignment of pipes. A laser device 20 (Fig. 1) generates a beam 201 that propagates through the longitudinal axis within a pipe, striking a target apparatus 10. The target apparatus comprises a rectangular target member 20 (Fig. 6), made of a transparent dielectric material, and having indicia of horizontal and vertical lines 23. The laser beam spot is visible on the dielectric material, whereby one may align the pipe by adjusting the pipe such that the laser spot falls upon the center of the target.

However, we consider Shoemaker as merely a cumulative reference in the present rejection. Wells discloses, in Fig. 3, a surveying instrument system including an instrument 30 from which a laser emanates through pinhole 33 towards instrument 20. A servomechanism within instrument 20 may automatically align the instrument 20 by centering laser target image 29 on CCD device 47. (Figs. 4a through 4c; column 8, line 55 through column 9, line 1.) This portion of Wells’ disclosure is clearly more pertinent to appellants’ invention than that of Shoemaker. Although not mentioned in the examiner’s rejection, the examiner does note the centering disclosure of Wells in the response to arguments, on pages 12 and 16 of the Answer.

Wells also discloses that, in the alternative of using two separate instruments, the system may be used in a single instrument with light reflected from a target. (Column 6, lines 58 through 64.) Thus,

Wells discloses the entire subject matter of appellants' Claim 1 except for the flashing of the light emitter and calculating the difference of image signals. ("Wells discloses items A [the telescope] and B [the solid state image sensor]" -- Brief at 7.)

Appellants refer to Figs. 4a through 4c of Wells on page 7 of the Brief, and submit arguments concerning alleged differences. However, the arguments are not commensurate with the scope of appellants' Claim 1. Moreover, appellants do not address the clear indication at column 8, lines 64 et seq. of Wells -- "[T]he operator may allow incorporated servo-drive mechanisms within the instrument to accomplish such alignment automatically upon direction of data from CCD device indicating the displacement of the focussed laser target image 49 from the centrix [sic, centric] of sensor 47."

Turning again to the examiner's rejection, the examiner relies on McClenahan for disclosure of the "on-off arrangement," and points in particular to column 9, lines 17-35. The examiner states, "it is well known in the measuring art to obtain a difference between the on signal and the off signal of a flashing light that is illuminating a target so as to provide the cancellation of background noise allowing for an accurate output result." (Answer at 5.)

McClenahan discloses a vehicle wheel alignment system that includes "sensor units" 19 (Figs. 1 and 3). With reference to Fig. 10 of McClenahan, each "sensor unit" includes an emitter (light emitting diode) 25, an optional filter 53, a mask 33, and a sensor (CCD) 29. Mask 33 contains slits 35 (see also Fig. 7), which cause light from LED 25 to fall on different areas of CCD 29, dependent upon the

relative angular displacement of the wheels. Column 8, lines 44-61 of the reference discloses that the angle is determined from sensing the discrete areas of the CCD array upon which the light falls, after passing through the slits 35 of mask 33. Compare Fig. 8 (zero degrees of relative angle) with Fig. 9 (non-zero degrees). Column 9, lines 17-35 discloses that the emitter is caused to have cycles of light and dark, with the dark exposure subtracted from the light portion of the cycle in order to cancel “background noise”.

Appellants argue that the patent to McClenahan is not analogous art. (See Brief at 9-11.) Appellants also allege, in the final paragraph of page 13 of the Brief (nominally in support of Group II of the claims), that substantive differences exist between appellants’ disclosed “emitter for emitting flash light” and the apparatus of McClenahan.

The examiner has the initial burden under Section 103 of establishing a prima facie case of obviousness. The burden may be met only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references. In re Fine, 837 F.2d 1071, 1073, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988).

The determination of whether or not McClenahan is analogous art is unnecessary. Even if the artisan were presumed to be familiar with the teachings of McClenahan, it has not been established that an artisan would have been led by the teachings of the references, or knowledge generally available to

the artisan, to arrive at the claimed subject matter, absent hindsight of appellants' disclosure.

McClenahan discloses canceling "background noise" by subtracting the dark portion of a cycle from the light portion of the cycle. However, the "background noise" identified in the reference consists of reflected, as opposed to direct, light beams in the environment of wheel alignment systems. See the statement of "Background of the Invention" in the reference, and particularly column 1, line 45 through column 2, line 9.

In the prior art before us, there is nothing to suggest that unwanted (i.e., additional) reflections of the light returning from a target were a problem in surveying instruments. Wells discloses that surveying measurements may practically range from six up to 250 meters. (Column 5, lines 25-29.) The reference also discloses that error measurements may occur due to "atmospheric scintillations," and teaches repeating the measurements to reduce the errors. (See column 10, lines 14-36.)

It thus appears that the normally occurring optical "noise" in a surveying system -- that is, received light that is additional to the transmitted light -- is light from external sources, rather than from extraneous reflections of the transmitted light. McClenahan discloses that filter 53 (Fig. 10) is provided to minimize the effect of ambient light on sensor 29. See column 9, lines 2-6 of the reference. The teaching of the reference that may be applicable to the use of survey

instruments is to provide an optical filter in the system, rather than flashing an emitter and calculating differences in images.

There is no suggestion in the references to make the replacement or modification of the light beam apparatus in a survey instrument. Nor has the examiner provided reasons why the ordinary artisan would have expected advantages in replacing or modifying a light beam apparatus in a survey instrument, based on the disclosed scheme in the environment of vehicle wheel alignment. Appellants argue, “None of the cited references suggest that background noise is a problem in the surveying art.” (Brief at 9.) We find no evidence in the record that the artisan recognized a need to cancel “background noise”, such as that disclosed by McClenahan, when aligning a survey instrument with a target, such as when using the survey instrument disclosed by Wiklund or Wells.²

We might speculate that the signal to noise ratio (i.e., the ratio of light transmitted and reflected from the target to ambient light) would be increased if Wells’ system were to calculate the difference in received images between “on” and “off” cycles of transmission. However, on the basis of the applied references, the examiner has not shown that the artisan would have been motivated to flash the emitter in a surveying instrument, and calculate image differences between

² We do not read appellants’ statement on page 11 of the Brief, regarding “the conventional elimination of background noise,” as an admission that the technique disclosed by McClenahan is conventional with respect to surveying instrument apparatus.

light and dark portions of the cycle.

For the foregoing reasons, the rejection of Claims 1, 3/1, and 7/1 is reversed.

Claims 2, 3/2, 4, 5, 6, 7/2, 8, 9, and 10

In the statement of rejection, the examiner merely refers to Fig. 1 of Wiklund for disclosure or suggestion of the subject matter of Claim 2. (Answer at 5.) The examiner's response to arguments in support of Claim 2 (principally at pages 16 and 17 of the Answer) also fails to deal with the specific requirements of Claim 2. The examiner has thus failed to set forth a prima facie case for obviousness of the subject matter. Accordingly, the rejection of Claims 2, 3/2, 4, 5, 6, 7/2, 8, 9, and 10 is reversed.

CONCLUSION

The rejection of Claims 1-10 is reversed.

REVERSED

ERROL A. KRASS)
Administrative Patent Judge)
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JERRY SMITH
Administrative Patent Judge

HOWARD B. BLANKENSHIP
Administrative Patent Judge

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